

Relationship between Endometrial Thickness and Endometrial Pattern with Pregnancy Rate

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Abstract

Introduction: Infertility is defined as lack of pregnancy after one year of sexual contact without the use of any contraception. The aim of this study was to investigate the association between thickness and endometrial pattern with B-HCG test in women undergoing induction of ovulation who referring to infertility clinic of Ali ebn Abitalib Hospital in Zahedan (southern province of Iran). **Materials and methods:** This cross-sectional study was conducted in 2017 at Ali ebn Abitalib Hospital in Zahedan (Iran). The thickness and endometrial pattern were determined using transvaginal sonography and the pregnancy rate was determined based on BHCG test. Data were analyzed by SPSS version 22 using Chi-Square and Independent T-test. **Results:** In this study, 200 individuals with mean age of 29.6 ± 5.6 years were studied. The negative or positive BHCG distribution was significantly different in terms of endometrial pattern ($P = 0.001$), so that in the three line pattern of endometrial thickness, 35.3% had BHCG positive cases, while in homogenous pattern, 3/3% had BHCG positive cases. Pregnancy rate in women with endometrial thickness greater than 7 mm was significantly higher than those who were less than 7 mm thickness (35.1% vs. 12.8%; $P < 0.001$). **Conclusion:** Overall, the results of this study showed that there was a significant relationship between the endometrial pattern and its thickness and pregnancy rate based on the positive BHCG test.

Key words: Endometrial Thickness, Endometrial Pattern, Serum Bhcg, Induction of Ovulation

Introduction

Infertility is defined as lack of pregnancy after 12 months or more of unprotected intercourse without any contraception (ASRM,

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2013). Infertility is one of the most common problems of societies, and according to a large systematic analysis published in 2012, approximately 45-52.6 million couples (on average 48.5 million couples) suffer from this problem (Mascarenhas & et al, 2012).

Female factors are the most common causes of infertility. Among these factors, ovulatory disorders are the most common causes of female infertility.

Induction ovulation is the main treatment for ovulatory disorders, and in cases of unexplained infertility and poor male factor, induction ovulation is associated with Intra Uterine Insemination (IUI) therapy is used that increases the number of oocytes and the number of sperm motility and eliminate cervical factor (Fouda & Sayed, 2011).

Endometrial thickness and pattern have contributed to the success of the assisted reproductive technology (ART). Although endometrial evaluation is a standard procedure during diagnostic evaluation and infertility treatment, the clinical significance of the difference in thickness and appearance of the endometrium is still discussed and several studies show a meaningful relationship between the amount of pregnancy and the thickness of the endometrium, while others has been rejected the presence of such a connection (Esmailzadeh & Faramarzi, 2007; Friedler & et al, 1996; Rashidi & et al, 2005; Zhao, Zhang & Li, 2012, Zhao & et al, 2014;).

The aim of this study was to investigate the relationship between thickness and endometrial pattern with B-HCG test in women underwent induction ovulation referred to obstetrics and gynecology clinic of Ali ibn Abitalib Hospital in Zahedan (Iran).

Materials & Method

This descriptive-analytical study was conducted in 2017 at Ali ibn Abitalib Hospital in Zahedan (Iran). In which 200 patients with infertility referred to gynecology clinic of Ali ibn Abitalib hospital in Zahedan were studied. Inclusion criteria included all patients with ovulatory dysfunction, ages 35-18, and at least one year of marriage age, and exclusion criteria were endometrial polyps, uterine anomalies, and reluctance to participate in the study.

In all patients, measuring the thickness of the endometrium and examining its pattern was performed after 15 minutes of rest and complete bladder emptying. All sonography were performed by an experienced sonographer with a single ultrasound device. The endometrial pattern was characterized by transvaginal ultrasonography as homogeneous or triple-line.

After measuring the thickness of the endometrium and determining its pattern, serum letrozole 5mg were prescribed from day 3 to day 7 of the menstrual cycle for each patient, and after 2 to 3 weeks, serum B-HCG was measured to determine the pregnancy.

All participants in this study were informed and written informed consent, and this plan was approved by the Ethics Committee of Zahedan University of Medical Sciences. Data were analyzed by SPSS software version 22 using chi-square and Independent T-test.

Results

In this study, 200 individuals with mean age of 29.6 ± 5.6 years were studied. 69.8% of the subjects had triple-line endometrial pattern and 30.2% had homogeneous pattern. BHCG test was positive in 25.6% of subjects.

To analyze the data in Table 1, chi-square was used. This showed that BHCG negative or positive distribution was significantly different in terms of endometrial pattern ($P = 0.001$), so that in triple-line endometrium pattern, about 35.3% had positive BHCGs, while in homogeneous pattern, about 3/3% were positive BHCG. To report the correlation of endometrial pattern with positive or negative BHCG, the Φ coefficient was used, which was 0.33. In addition, the chance for positive BHCG in those having Triple-line endometrial pattern was 15 times as high as those having the Homogeneous endometrium. Independent t-test showed that the mean endometric thickness in both groups with positive and negative BHCG had no significant difference (Table 2) ($P = 0.73$).

Table 1- Distribution of Positive and Negative B-HCG Posology by Endometrial Pattern in Women under induction ovulation

			BHCG		Total
			negative	positive	
Endometrial pattern	Triple-line	N (%)	90 (64.7)	49(35.3)	139 (100)
	homogeneous	N (%)	58(96.7)	2(3.3)	60(100)
Total		N (%)	148(74.5)	51(25.5)	199(100)

Table 2- Comparison of Endometrial Thickness in Women with B-HCG Positive and Negative

BHCG	N (%)	Mean \pm SD	P Value
negative	148 (74.3 %)	7.3 \pm 1.5	0.73
positive	51 (25.6 %)	8.5 \pm 1.4	

Discussion

The aim of this study was to determine the relationship between endometrial thickness and endometrial pattern with B-HCG positive in women underwent induction ovulation referred to infertility clinic of Ali ibn Abitaleb Hospital in Zahedan. Results showed that 69.8% was based on triple-line endometrial pattern and 30.2% homogeneous pattern. BHCG test was positive in 25.6% of patients, and the rate of positive BHCG in this test was significantly higher in patients with triple-line endometrial pattern than in homogeneous pattern. In the Jing Zhao et al. (2012) study in China in 1933, IVF-treated women had more pregnancy in the triple-lined pattern than in homogeneous (Zhao, Zhang & Li, 2012). In another study by Jing Zhao et al (2014), the highest clinical pregnancy rate was observed in patients with a triple-line pattern (Zhao, Zhang & Li, 2012). Contrary to the results of our study, in the study of Hosseini Rashidi et al (2004) in Tehran on 150 infertile women, the incidence of pregnancy following IVF / ICSI was 20%, but there was no correlation between endometrial pattern and pregnancy rate (Rashidi & et al, 2005). However, the difference in the results of various studies in this area can be due to different design studies and also because of the fact that the results of ultrasound are completely dependent on a person, but the exact mechanism of the effect of the endometrial pattern on pregnancy rate is not known and requires further studies in this field.

In this study, the mean endometric thickness was not significantly different between two groups with positive and negative BHCG ($P = 0.73$). However, by categorizing patients based on the thickness of the endometrium into two groups of less than 7 mm and more than 7 mm, the results of Chi-Square showed that the gestational age was significantly higher in endometrial patients than 7 mm in patients with endometrial thickness less than 7 mm (35.1% vs. 12.8%, $P < 0.001$). Jing Zhao (2012) also stated that the thickness of the endometrium could be considered as an independent factor in predicting the pregnancy rate and the highest pregnancy rate was in the thickness between 7-14 mm (Zhao, Zhang & Li, 2012). In the study of Esmailzadeh et al. (2007), the mean endometrial thickness in the pregnant women group was significantly higher than non-pregnant women (Esmailzadeh & Faramarzi, 2007). In contrast to the results of our study, in the study of Hosseini Rashidi (2004), the mean thickness of endometrium in the pregnant women was not significantly different between the pregnant women (Rashidi & et al, 2005). The reason for the difference in the results of studies in this area may be attributed to the time of measuring endometrial thickness. As Jing Zhao (2014) reported that endometrium of pregnant women did not compare with pregnant women, endometrium were thinner on the third day, and on the day of prescribing the hCG was thicker (Zhao & et al, 2014; Esmailzadeh & Faramarzi, 2007; Gardner & et al, 2016).

Conclusion

In general, the results of this study showed that the fertility rate in the women with endometrial triple-line pattern, as well as in

women with endometrial thickness greater than 7 mm, was significantly higher than women with a homogeneous pattern and thickness less than 7 mm.

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Authors' contributions

Dr Farahnaz Farzaneh conceived of the presented idea, developed the theory and performed the examination, verified the analytical methods and supervised the findings of this work. All authors discussed the results and contributed to the final manuscript and dr farahnaz farzaneh wrote the article.

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Conflict of interest

The authors declare no conflict of interest regarding the publication of this paper.

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